

FIGURE 1

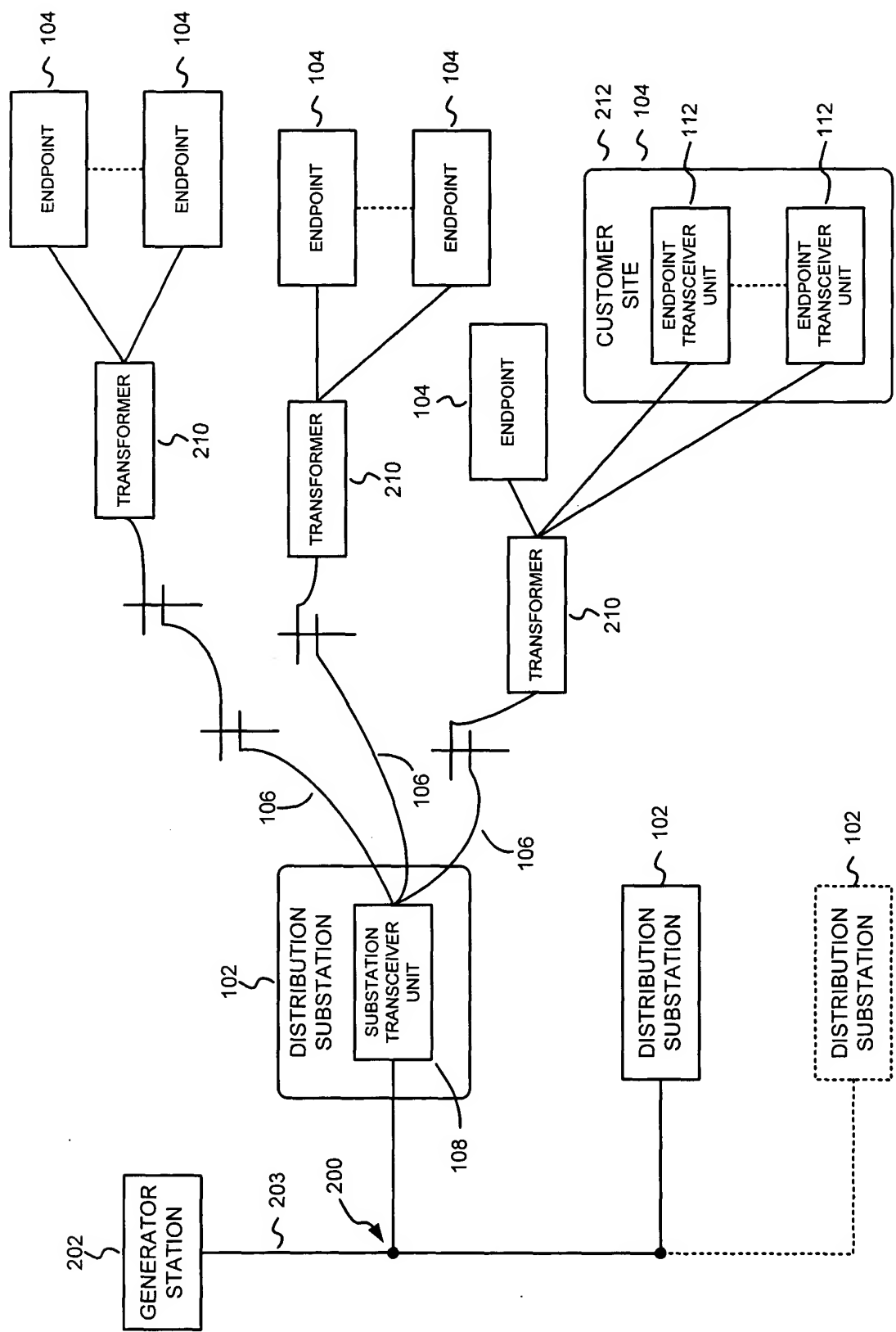


FIGURE 2

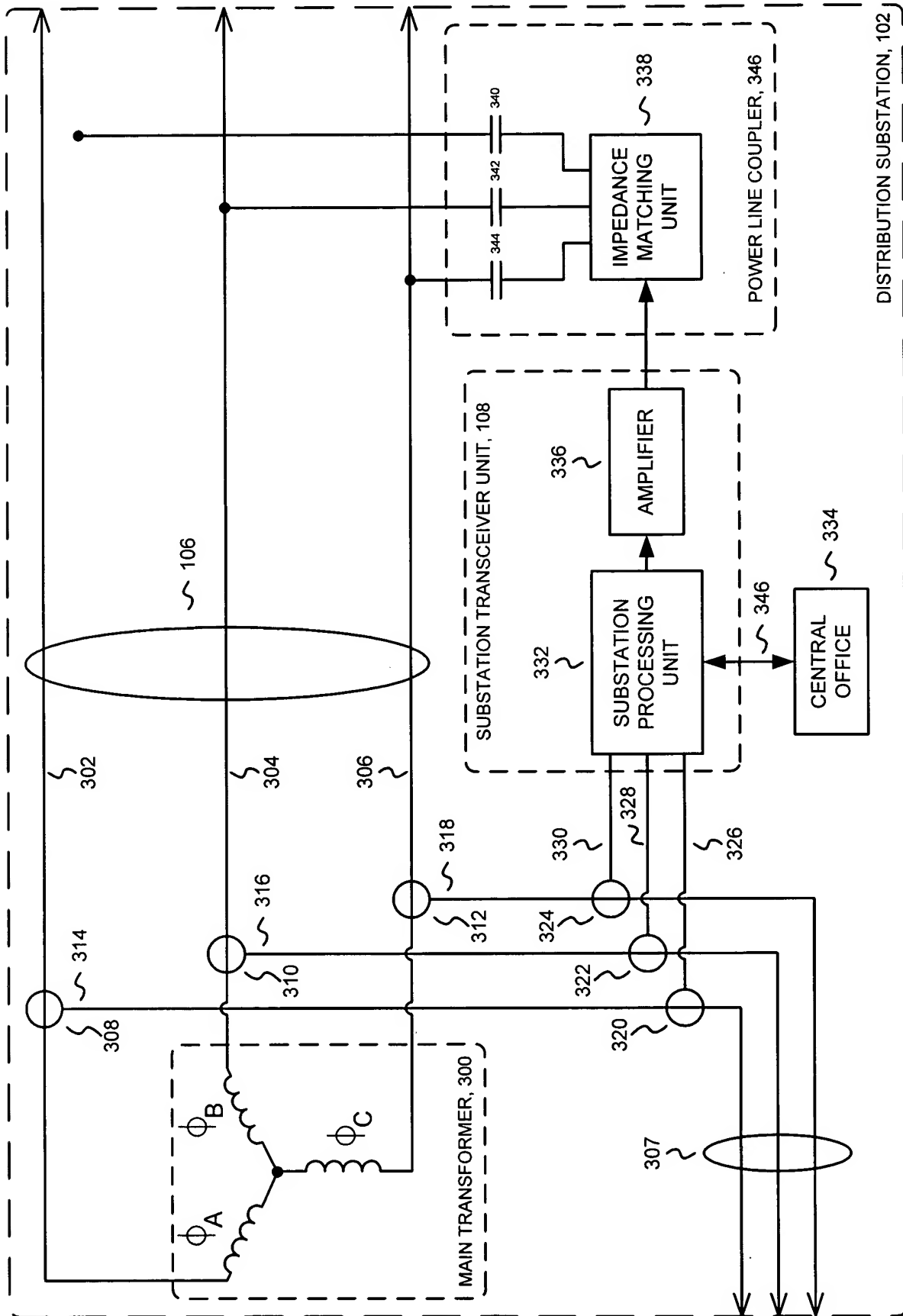


FIGURE 3

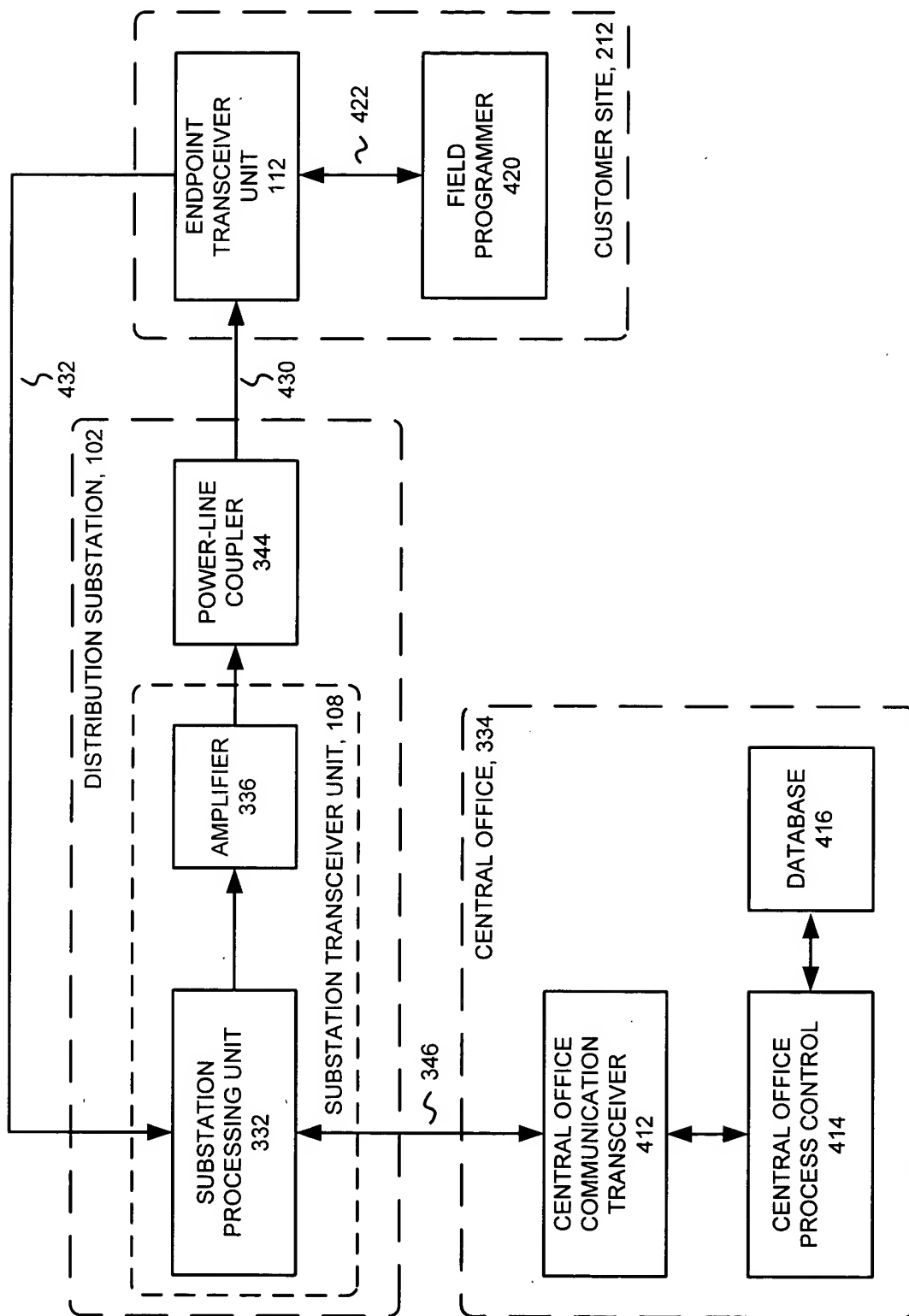


FIGURE 4

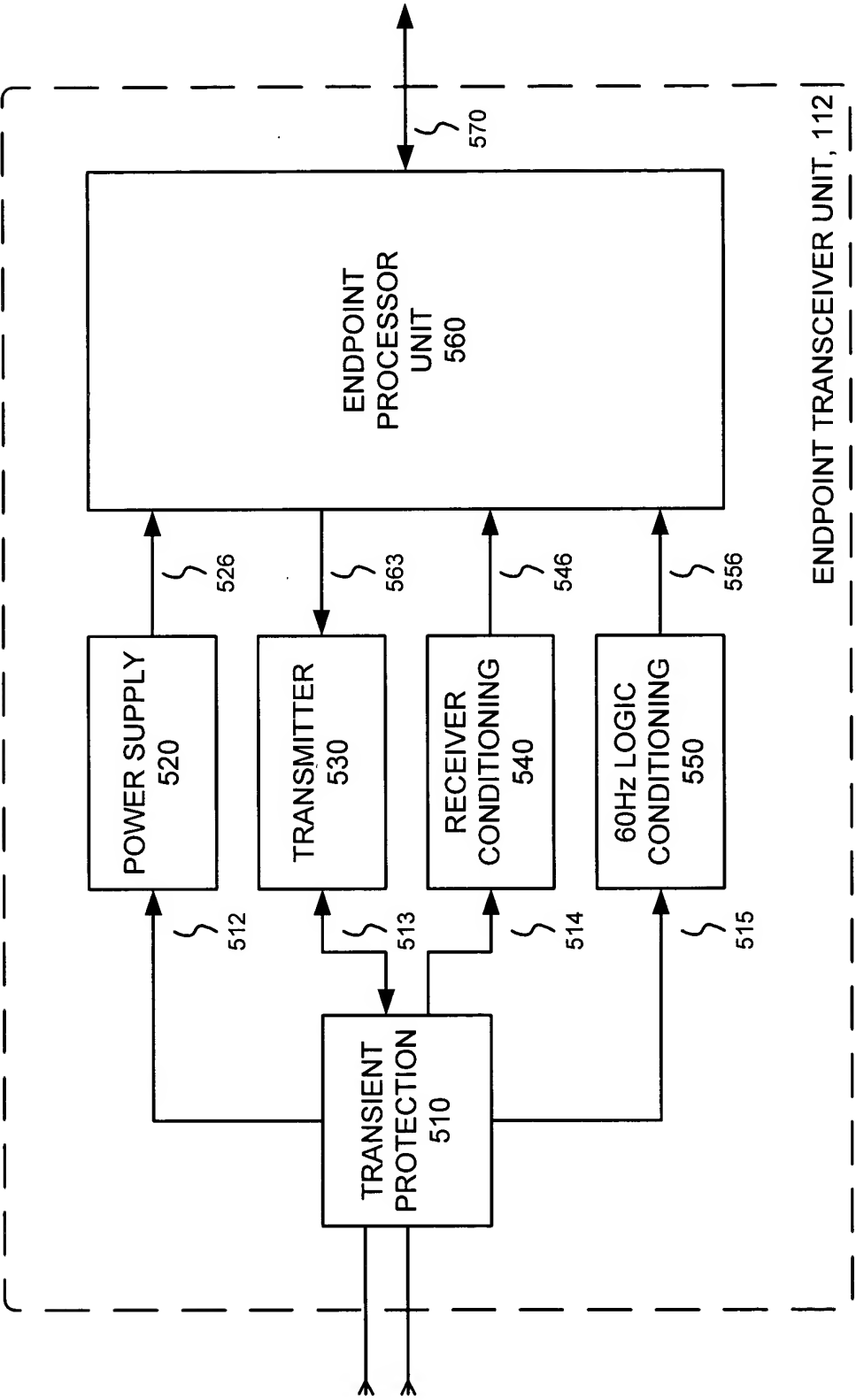


FIGURE 5

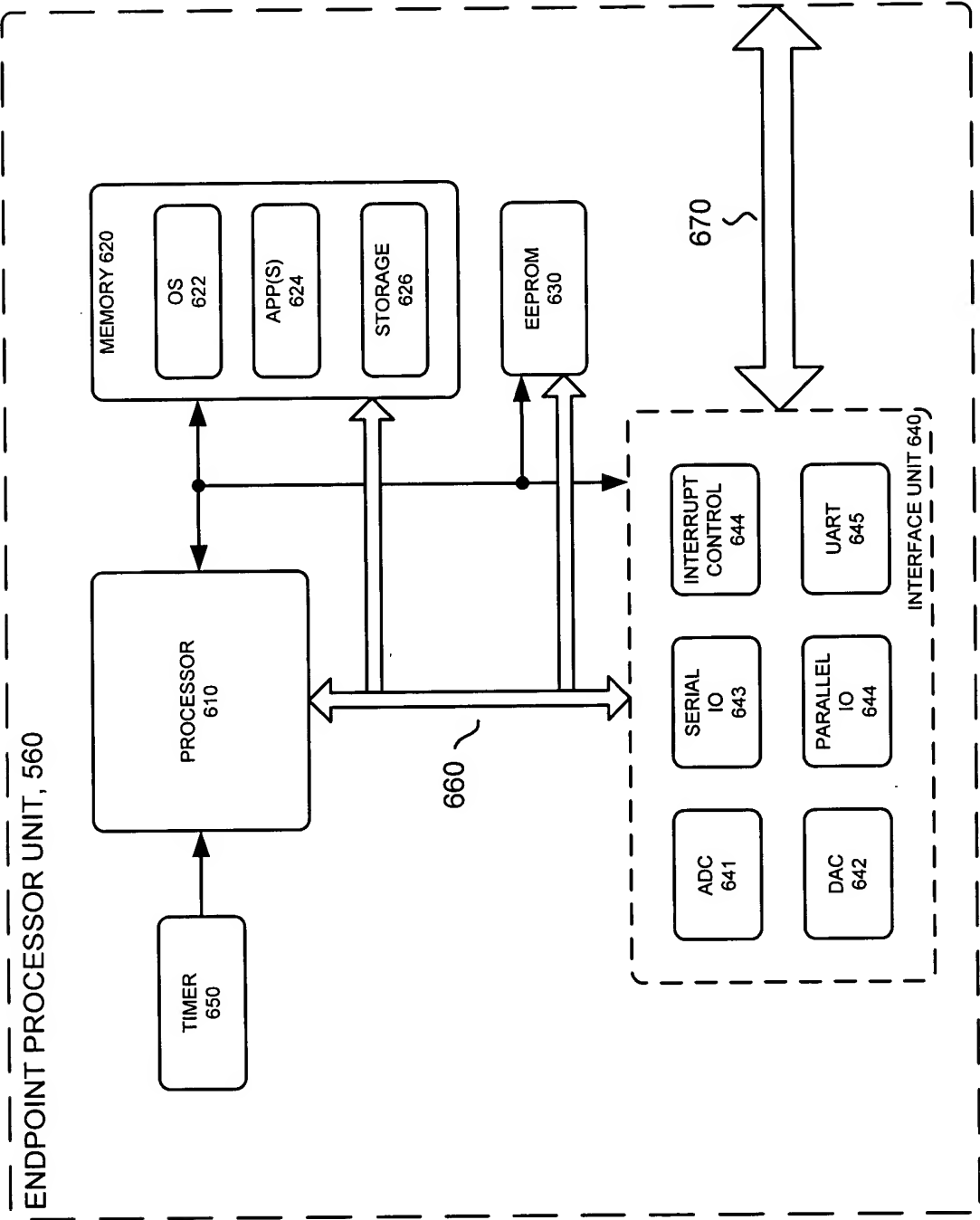
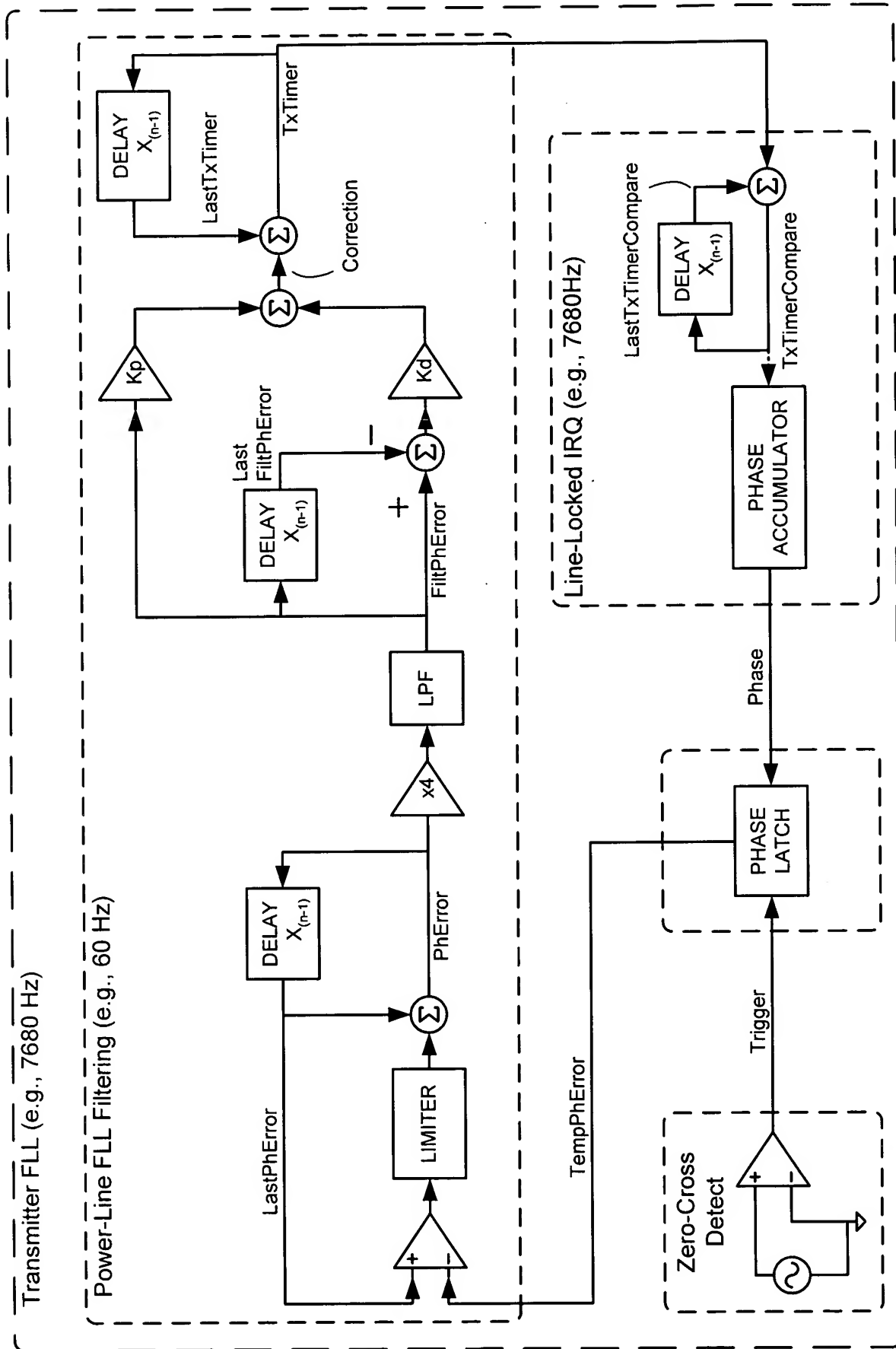


FIGURE 6



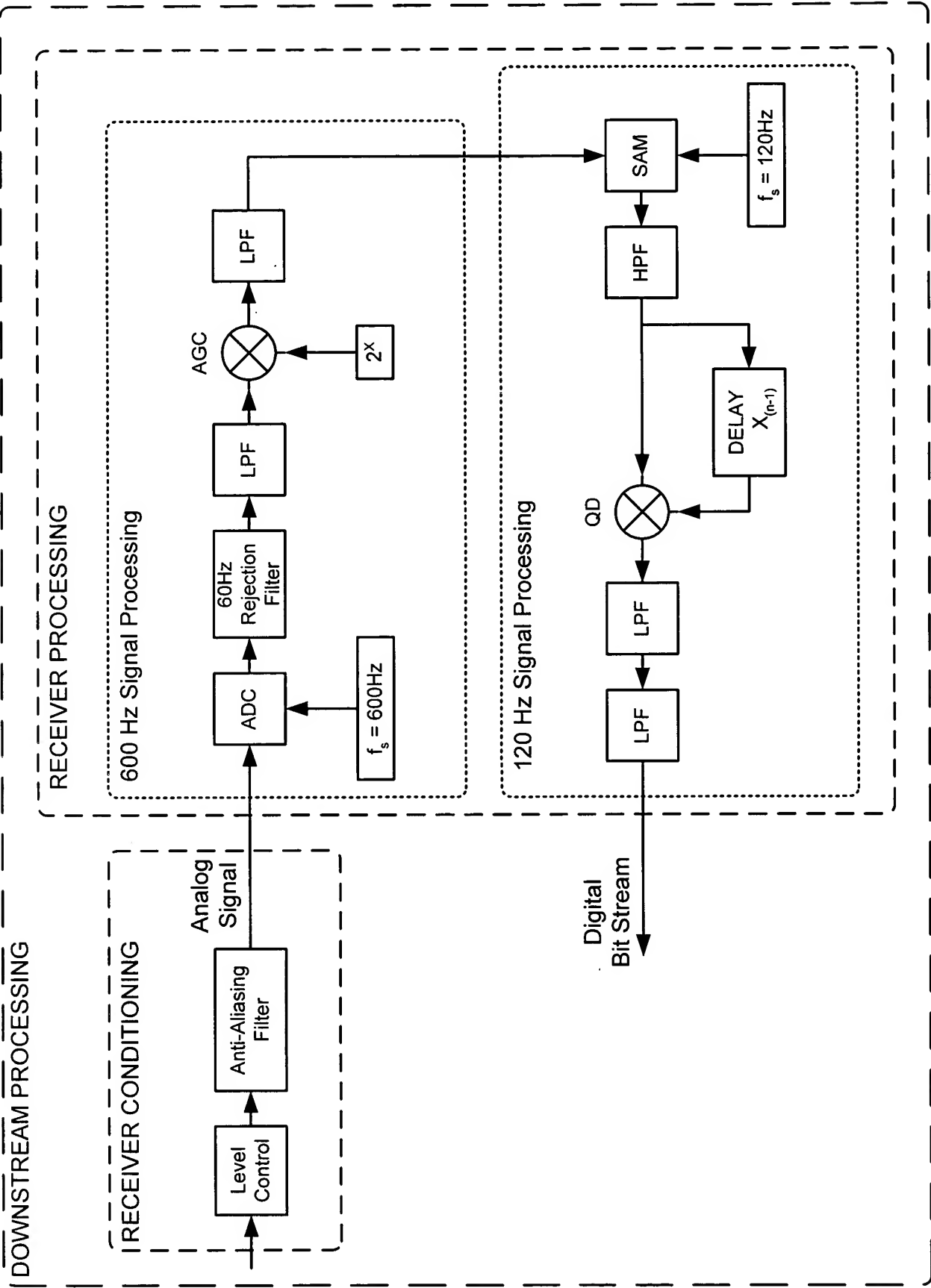
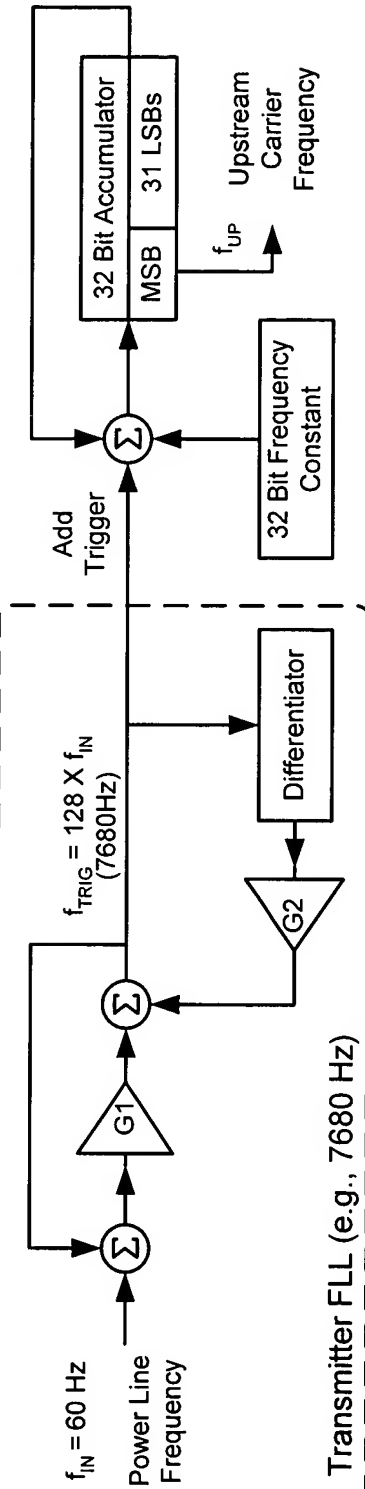


FIGURE 9

UPSTREAM PROCESSING

Upstream Carrier Generation



Power Supply and Transmitter

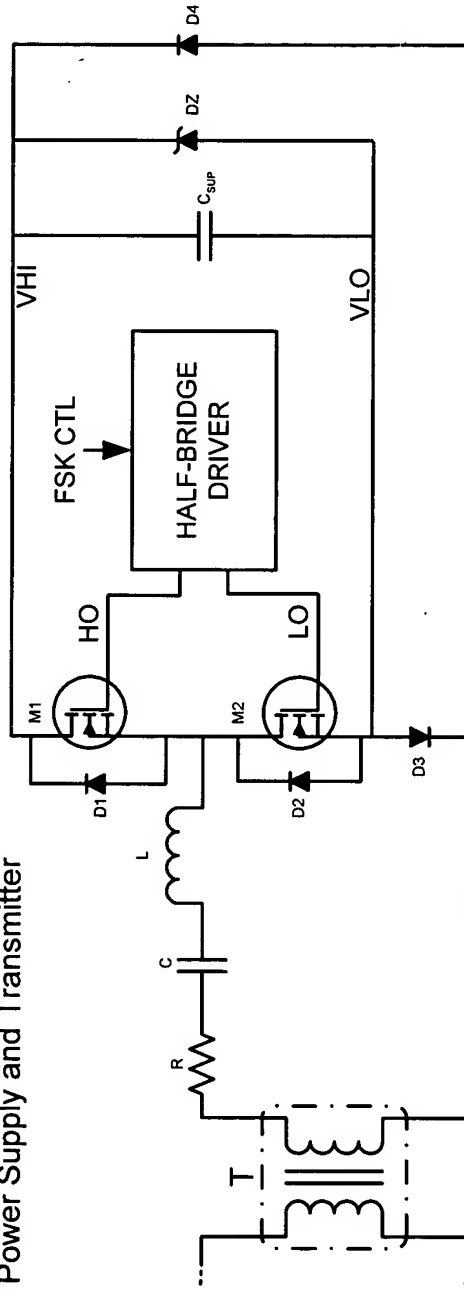


FIGURE 10

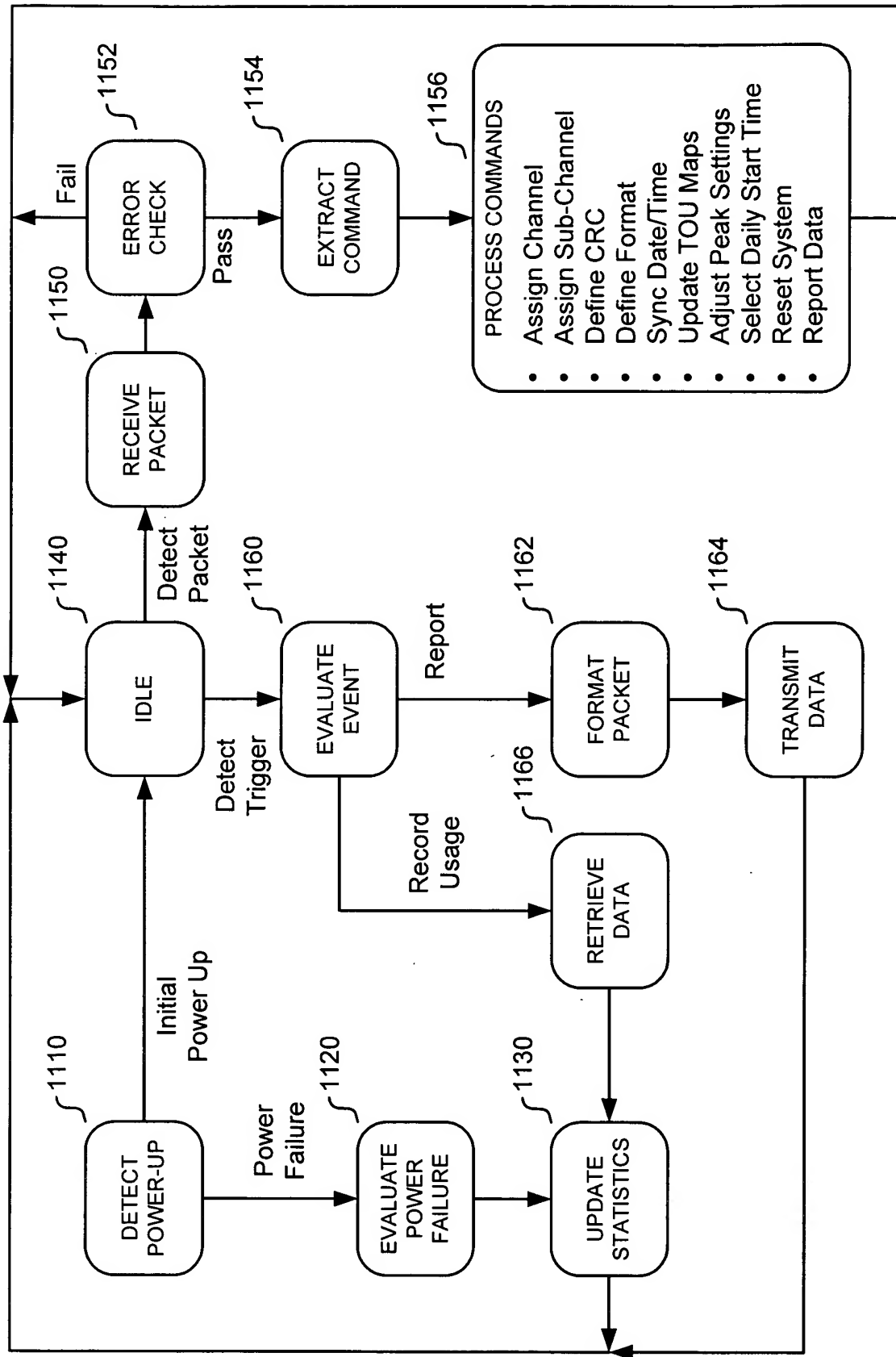


FIGURE 11

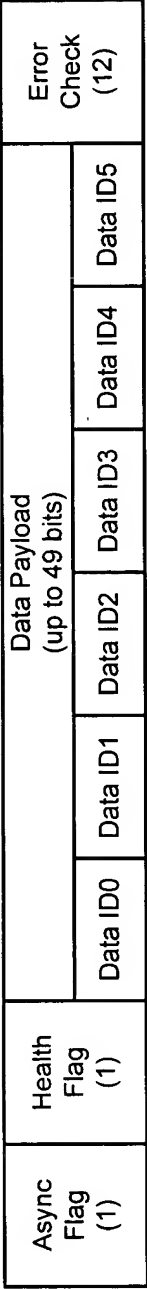


FIGURE 12

| DataID | Name | Description |
|---------|---------------|---|
| 0 | Null | Empty Packet or ending packet |
| 1 | KWH1 | Current power usage meter reading in units of kWH |
| 2 | TOU1 | Null or the total number of kWH accumulated in the TOU1 bucket |
| 3 | TOU2 | Null or the total number of kWH accumulated in the TOU2 bucket |
| 4 | TOU3 | Null or the total number of kWH accumulated in the TOU3 bucket |
| 5 | TOU4 | Null or the total number of kWH accumulated in the TOU4 bucket |
| 6 | Peak1 | Total number of kWH used at the recorded peak time for TOU1 Map |
| 7 | Peak2 | Total number of kWH used at the recorded peak time for TOU2 Map |
| 8 | Peak3 | Total number of kWH used at the recorded peak time for TOU3 Map |
| 9 | Peak4 | Total number of kWH used at the recorded peak time for TOU4 Map |
| 10 | Peak1Time | Time of peak demand for TOU1 Map |
| 11 | Peak2Time | Time of peak demand for TOU2 Map |
| 12 | Peak3Time | Time of peak demand for TOU3 Map |
| 13 | Peak4Time | Time of peak demand for TOU4 Map |
| 14 | Peak1Date | Date for Peak1 Demand |
| 15 | Peak2Date | Date for Peak2 Demand |
| 16 | Peak3Date | Date for Peak3 Demand |
| 17 | Peak4Date | Date for Peak4 Demand |
| 18 | LastPeak1 | Last Peak1 Demand |
| 19 | LastPeak2 | Last Peak2 Demand |
| 20 | LastPeak3 | Last Peak3 Demand |
| 21 | LastPeak4 | Last Peak4 Demand |
| 22 | LastPeak1Time | Time of Last Peak1 demand |
| 23 | LastPeak2Time | Time of Last Peak2 demand |
| 24 | LastPeak3Time | Time of Last Peak3 demand |
| 25 | LastPeak4Time | Time of Last Peak4 demand |
| 26 | LastPeak1Date | Date of Last Peak1 demand |
| 27 | LastPeak2Date | Date of Last Peak2 demand |
| 28 | LastPeak3Date | Date of Last Peak3 demand |
| 29 | LastPeak4Date | Date of Last Peak4 demand |
| 30 - 41 | ----- | Reserved |

TABLE 1

| DataID | Name | Description |
|----------|-------------------|--|
| 42 | MomInt | Total number of momentary interruptions |
| 43 | MomEvent | Total number of momentary event interruptions |
| 44 | SusInt | Total number of sustained interruptions |
| 45 | SusIntDur | Total accumulated time for sustained interruptions |
| 46 | ConfigStatusFlags | Configuration status flags |
| 47 | SerNum | An internal serial number for the endpoint |
| 48 | ModelID | Identifies the model type or model family for the endpoint |
| 49 | HWRev | Hardware revision ID for the endpoint |
| 50 | SWVersion | Software version info for the endpoint |
| 51 | FlashCRC | CRC of application code |
| 52 | ReqID | Request ID of last async-type request received by the endpoint |
| 53 | LastResetTime | Time of last demand reset in minutes |
| 54 | LastResetDay | Day of the last demand reset in day-of-year format |
| 55 | Group 0 | Group Address that the endpoint subscribes to for downstream reception |
| 56 | Group 1 | Group Address that the endpoint subscribes to for downstream reception |
| 57 | Group 2 | Group Address that the endpoint subscribes to for downstream reception |
| 58 | Group 3 | Group Address that the endpoint subscribes to for downstream reception |
| 59 | Group 4 | Group Address that the endpoint subscribes to for downstream reception |
| 60 | Group 5 | Group Address that the endpoint subscribes to for downstream reception |
| 61 | Group 6 | Group Address that the endpoint subscribes to for downstream reception |
| 62 | Group 7 | Group Address that the endpoint subscribes to for downstream reception |
| 63 | PacketStartTime | Time of the day that the first bit of the upstream transmission starts |
| 64 | ElectricMetTime | The time at which electric metrology readings are captured - time in minutes |
| 65 | MomLogPtr | Memory address pointer for storing the next detected momentary interrupt |
| 66 | TxConst0 | Transmitter upstream frequency constant for logic 0 modulation |
| 67 | TxConst1 | Transmitter upstream frequency constant for logic 1 modulation |
| 68 | TxSubID | Sub-channel ID assigned for upstream communications |
| 69 - 129 | ----- | Reserved |
| 130 | InternalBIT | Built in test flag for internal faults |
| 131 | InterfaceBIT | Built in test flag for interface faults |
| 132 | SystemStatus | Built in status flags |

TABLE 2

| DataID | Name | Description |
|--------|-----------------|--|
| 133 | Minutes | The current endpoint time in minutes (0 - 1439, 0 = Midnight) |
| 134 | DayOfWeek | The current endpoint day of the week (0 - 6, 0 = Sunday) |
| 135 | DayOfYear | The current endpoint day of the year (0-365, 0 = Jan 1) |
| 136 | TxBuffer | A variable length buffer that is internally used by the endpoint |
| 137 | SubIDCount | Number of SubIDs received by the endpoint since power-up |
| 138 | SequenceNum | The sequence number of the currently loaded packet |
| 139 | Temperature | The current internal temperature of the endpoint |
| 140 | SubID | Current sub-channel ID for the current downstream transmission |
| 141 | Demand | Instantaneous demand recorded by the endpoint over the last peak demand interval |
| 142 | WhiteFilter | Filtered maximum level for white while the disk is in the white state |
| 143 | BlackFilter | Filtered minimum level for black while the disk is in the black state |
| 144 | WhiteThreshold | Threshold above which the disk state is considered white |
| 145 | BlackThreshold | Threshold below which the disk state is considered black |
| 146 | OptoMin | Minimum reading for FilteredOpto |
| 147 | OpticMax | Maximum reading for FilteredOpto |
| 148 | FilteredOpto | Filtered optic reading that is used to determine the disk state |
| 149 | KhConst | 32-bit constant |
| 150 | AGCLevel | 8-bit AGC setting, where the gain of the front end is set to $2^{AGCLevel}$ |
| 151 | MeterGroupCRC | The CRC of the Meter and Group configuration settings |
| 152 | BlackMin | Minimum reading while disk is in a black state - unfiltered |
| 153 | WhiteMax | Maximum reading while disk is in a white state - unfiltered |
| 154 | OptoSample | Unfiltered Optic reading |
| 155 | KWHAccumulator | 32-bit partial kWH accumulator in units of $1/2^{24}$ of a kWH |
| 156 | Kp7680 | 8 Bit 7680 Hz FLL proportional error gain coefficient |
| 157 | Kd7680 | 8 Bit 7680 Hz FLL differential error gain coefficient |
| 158 | Kp60 | 8 Bit 60 Hz FLL proportional error gain coefficient |
| 159 | Kd60 | 8 Bit 60 Hz FLL differential error gain coefficient |
| 160 | Kc60 | 8 Bit 60 Hz FLL common gain coefficient |
| 161 | FLL7680UnLckCt | Unlocked counter for 7680 Hz FLL |
| 162 | FLL7680UnLckMax | Max since power-up of Unlocked counter for 7680 Hz FLL |

TABLE 3

| DataID | Name | Description |
|-----------|---------------|--|
| 163 | FLL60UnLckCt | Unlocked counter for 60 Hz FLL |
| 164 | FLL60UnLckMax | Max since power-up of Unlocked counter for 7680 Hz FLL |
| 165 - 254 | ----- | Reserved |
| 255 | OnesFill | 56-bit constant of all 1's for filling upstream packets when necessary |

TABLE 4